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NEW SOVIET ROLLING MILLS DEVELOPED; STEEL-MAKING PROCESSES IMPROVED

/Numbers in parentheses refer to appended list of sources./

Among new developments in ferrous metallurgy in 1950 are production of improved equipment for metallurgical plants and further improvement in metallurgical processes.

The Novo-Kramatorsk Machine-Building Plant imeni Stalin in Elektrostal' has approved the working blueprints for new large-section mills for the "Azovstal'" and Novo-Tagil'skiy metallurgical plants. The designers, headed by Engineer M. Karpyshev, have developed equipment which is distinguished by a high degree of mechanization and automatization as well as productivity. Designer V. Khutornoy has designed in record time a new sheet mill for rolling alloys, and the design has already been put into production. A metallurgical plant has already obtained the complex automatic equipment -- the "trio" (three-high) working stand, hoist mechanisms, and roller tables. This same group of designers is now working on the development of the first complex equipment for rolling extremely small profiles -- equal to parts of a millimeter -- to be produced in the USSR.

A design group in the crane-building bureau (I. Osinskiy, senior engineer) have successfully developed an original and new design of a loading machine for wheel-rolling shops. These machine are already in operation in metallurgical plants.(1) The first blooming mill produced by the plant in the postwar period is considerably better than the prewar models and is outstanding particularly for its high productivity, maximum mechanization of all working processes, and universality in rolling technology. The new skelp mill is also the last word in technology.(2)

The new Soviet rail mill which was constructed by a group of engineers from Ural machine-building enterprises, under the direction of G. Khimikh, is said to have a production capacity which is 20 percent higher than the production capacity of any similar American rail mill. The mill is composed of 200 separate automatic and semiautomatic machines laid out in progression and requiring no physical labor.(3)

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Great production achievements and improvement in the Bessemer process resulted from a 6-month period of cooperative work between Fuklev, docent at the Central Asia Polytechnical Institute, and workers of the "Tashsel'mash" (Tashkent Agricultural Machine Building) Plant. All forces were directed toward the elimination of grave organizational defects which hindered smelting and caused overconsumption of materials. Formerly, because of the inefficient organization of work, the process of pouring the molten metal from the cupola into the Bessemer converter was drawn out, the blow lasted 45-50 minutes instead of the norm of 25 minutes, and the production cycle took double the planned time. The large losses of heat resulted in a waste of ferrosilicon. The charge in the cupola was not suspended, a factor which influenced the chemical content of the metal and length of the melt. The elimination of all these deficiencies in organization and technology made it possible to increase the durability of the converter tuyeres from 3-4 to 10 and more melts, to attain the norm for length of the blow, and to reduce consumption of ferrosilicon. Productivity of the equipment doubled, making it possible to meet an increased task. The workers are continuing their efforts to improve the technology of the smelting process. They have already further decreased the length of the production cycle by 20-30 percent better than the norm and have reduced consumption of materials. From preliminary data it seems the plant will have an annual saving of 240,000 rubles.(4)

In blast-furnace production, one of the most serious problems now being worked on is intensification of the process. The Chair of Pig Iron Metallurgy, headed by Professor A. D. Gotlib and Z. I. Nekrasov, Laureate of the Stalin Prize and Candidate in Technical Sciences, both of the Dnepropetrovsk Metallurgical Institute imeni Stalin, have done much work in the field with results which already have had practical application. The associates of the chair established that the intensity of blast-furnace operation can be increased by improving the distribution of the gas flow in a cross section (po secheniyu) of the furnace. Instruments developed by the institute for automatic control of peripheral gases help to regulate the operation of the furnace in accordance with the gas flow, to improve the furnace operation, and to increase its productivity. The use of these instruments in blast-furnace shops of several Dnepr and Donbass plants has resulted in a substantial increase in the output of pig iron and has saved millions of rubles.(5) The method of regulating blast-furnace operation by analysis of the peripheral gases is now used in all blast-furnace shops of the Dnepr region.(6)

Associates of the institute's Chair of Steel Metallurgy under the direction of V. I. Lapitskiy, Candidate in Technical Sciences, are conducting research in close cooperation with high-speed steelworkers. Development of the scientific basis for high-speed smelting has helped to outline the path for further increase in steel output in open-hearth furnaces. The Chair has also been studying the problems of improving the quality of deadmelt and rimming steel. The results of this work have been incorporated into technological instructions.

The institute's Chair of Pressure Working of Metals and the rolled metal division of the Institute of Ferrous Metallurgy, Academy of Sciences Ukrainian SSR, both directed by Professor A. Chekmarev, twice Laureate of the Stalin Prize and Active Member of the Academy of Sciences Ukrainian SSR, have maintained close association with many metallurgical plants in the country. The two groups have been studying methods of increasing the productivity and improving the work of rolling mills, the mechanization of rolling procedures, and production of new types of profiles needed by the national economy. The section-rolling mills have been give the most attention. Their productivity can be increased only by extensive use of mechanization, substitution of machines for hand labor of operators in turning, feeding the metal into the rollers, and moving from table to table. Research work in this field was completed with the introduction of new machinery on two rolling mills. An automatic guide device was designed for transferring the metal from table to table, not only eliminating hand work but also increasing the mill's productivity. The chair, together with the Plant imeni Lenin, developed an automatic system of feeding ingots from the soaking pits to the pipe-rolling mill. The system also controls the speed of the feeding of the ingots and can change the speed depending upon work conditions. As a result, the mill works more smoothly and its productivity has increased.

The chair is also working closely with the Plant imeni Petrovskiy, which is undergoing basic reconstruction. New shops with modern metallurgical equipment are going up on the site of the old shops. The chair and the rolled metal division of the Institute of Ferrous Metallurgy daily take part in the work of reconstruction and of the rolling shops.

At the Nikopol' Southern Pipe Plant, the chair and plant workers have introduced multiple drawing of steel pipe instead of the old process of drawing with intermittent heat treatment. The new method has increased shop productivity almost 100 percent.(5)

An extremely important project completed at the "Serp i molot" Plant in Moscow was the intensification of the open-hearth process. Academician I. P. Bardin headed a group which included N. I. Mozgovoy, chief of the laboratory of the Central Scientific Research Institute of Ferrous Metallurgy, and K. G. Trubin, professor at the Moscow Institute of Steel imeni I. V. Stalin, which worked at the plant to improve open-hearth procedures. The group developed the technology for and introduced into the metallurgical industry the use of oxygen for intensifying the open-hearth process, a work which won the Stalin Prize in 1949. The first melts using oxygen were performed in the furnace operated by steelworkers Subbotin, Mikhaylov, and Chesnokov, 1950 Stalin Prize winners for improving the technology of steel smelting. The increase in the durability of the furnace completed the difficult scientific work of intensifying the open-hearth process. The 1950 Stalin Prize award cited the victory of the steelworkers.(7)

In addition to work on intensifying the open-hearth process, the Chair of Foundry Production, headed by L. I. Fantalov, of the Institute of Steel has introduced at the "Serp i molot" Plant a new method of casting steel and iron parts with the use of the so-called closed heads with gas pressure. The yield of finished castings increased 100 percent and the amount of rejects was cut in half. The institute is now working on measures to improve processes in rolling, casting and steel smelting.

The chair is also doing some interesting work at the Automobile Plant imeni Stalin on the regeneration (secondary use) of burned sand in casting. Until now, this sand had been thrown out as waste after its first usage. In a special process proposed by the institute, 80 percent of this sand is now reused (8)

In Leningrad, workers of the Kirov Plant, together with Professor Karnaukhov of the Leningrad Polytechnical Institute imeni Kalinin and Docent Morozov, developed an instrument for determining the carbon content of steel which is of tremendous importance in the production of high-grade alloy steels.(9)

Leading Leningrad steelworkers have helped to solve one of the most important problems in high-speed steel smelting -- speeding the process of dephosphorization. Scientists had held that the removal of phosphorus could occur only during the third and last stage of the melt, i.e., during the boiling period. The steelworkers reversed this theory and developed a process of dephosphorization of the melt during the so-called "inert" melting period, or second stage, so that there is no longer an inert stage. This, of course, sharply speeds the entire smelting process.(10)

SOURCES

1. Moskovskaya Pravda, No 105, 22 Jun 50
2. Pravda Ukrainy, No 162, 11 Jul 50
3. Wolnosc, No 91, 23 Apr 50
4. Pravda Vostoka, No 114, 18 May 50
5. Pravda Ukrainy, No 114, 16 May 50
6. Kazakhstanskaya Pravda, No 98, 11 May 50
7. Vechernyaya Moskva, No 118, 20 May 50
8. Moskovskaya Pravda, No 69, 11 May 50
9. Leningradskaya Pravda, No 91, 16 Apr 50
10. Leningradskaya Pravda, No 104, 1 May 50

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